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ANNUAL FOREST FIRE REPORT

OF THE

GAME, FISH AND FOREST FIRE DEPARTMENT

OF THE

PUBLIC DOMAIN COMMISSION

STATE OF MICHIGAN

REVIEWING RAILWAY SPARK ARRESTING EQUIPMENT.

FOR THE CALENDAR YEAR

1915

LANSING, MICHIGAN
WYNKOOP HALLENBECK CRAWFORD CO.
1916

FORESTRY DEPARTMENT
MAR 20 1916

ANNUAL FOREST FIRE REPORT

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1916

LETTERS OF TRANSMITTAL.

To the Public Domain Commission of the State of Michigan:

Gentlemen: Pursuant to the requirements of Section 5, Act 280, Public Acts of 1909, known as the act creating the Public Domain Commission, I have the honor to transmit herewith the forest fire report of this department for the current year, submitting and signing same in conformance with Act 28, Public Acts of 1915.

William R. Oates,
State Game, Fish and Forest Fire Commissioner.

Hon. Woodbridge N. Ferris, Governor:

Sir: We have the honor to transmit herewith a report of the Game, Fish and Forest Fire Department of the Public Domain Commission for the year 1915.

Very respectfully,
Junius E. Beal,
Member Board of Regents of the University.
Alfred J. Doherty,
Member of State Board of Agriculture.
Oramel B. Fuller,
Auditor General.
William Kelly,
Member of Board of Control, College of Mines.
Fred L. Keeler,
Superintendent of Public Instruction.
Coleman C. Vaughan,
Secretary of State.

REVIEW OF CONDITIONS.

Conservatively, more merchantable timber has been destroyed by forest fires and wasteful methods of logging in Michigan than has been manufactured into products for the utility service of man.

Pro-age value of burned seedlings and saplings swells the loss for the century past to a stupendous money value which can be guessed at in billions.

Prior to 1911 the annual loss as partially recorded was generally expressed in millions of dollars. In the year cited, data, carefully secured by this department, placed the loss at $3,470,258.18.

To combat the fire loss an annual appropriation of $10,000, or less than .003 of one per cent of the fire loss for 1911 was available. The economic inconsistency of the appropriation is apparent by this comparison. In 1915 the annual appropriation was increased to $20,000. This I regard as an inadequate fund for protection of the property involved.

MEANS FOR MINIMIZING.

With a view of minimizing this loss, this department in 1912 began a systematic and vigorous campaign for prevention and suppression of forest fires. Under this system segregation of work was made in three divisions:

(1) Organization of an effective fire-fighting force of field wardens, conforming to the National Forest Service regulations.

(2) Inspection of railway right of way, front-end and ashpan mesh on locomotives in the forest district.

(3) Educational propaganda for fire prevention, by lectures, and the Forest Scout movement and dissemination of literature and bulletins to stimulate public vigilance during dry and dangerous periods.

FIRE FIGHTING PATROL.

To accomplish a field organization that would prove efficient and non-interfering, selection of a chief fire warden was made. Under the direction of William J. Pearson as field executive an effective patrol service has been established.

Subdivisions of the patrol were designated as follows:

(1) Regular accredited deputies of this department, in charge of districts, with supervision of special and township fire wardens and impressed aid.

(2) Special wardens, subject to call at per diem wage in periods of drouth and fire menace, with supervision of impressed aid.

(3) Supervisors, township fire wardens under the law, with supervision over local conditions in absence of wardens with department commissions.

(4) "Flying Squadron," with provisions for telephone and telegraph call to assemble with dispatch at any given point.

SUPERVISORS TAUGHT DUTIES.

In order that newly elected supervisors might be familiarized with their obligations as fire wardens, attendance of district deputies at the initial meeting of each board in those counties lying in the forest zone was required by the chief fire warden.

At these meetings the representative of this department reviewed the forest fire law, submitted department methods for prevention and suppression of forest fires and recited the duties of township wardens.

Explanation was made of the powers of the supervisor in employing and impressing labor on fires, and the liability of the township in remunerating men for such work.

Special stress was laid on the fact that a local fire meant a local loss.

Supervisors now realize that the duties as fire warden is among their most important official functions, and they perform their duties earnestly and well.

Instruction to district deputies has placed especial emphasis on the value of a live and efficient district organization. To this end they have made it a point to keep in close personal contact with the supervisors and to acquaint them beforehand with all the department plans for control and suppression of possible fires. We commend the splendid and active cooperation which the supervisors have given us. It is this cooperation which has enabled us to provide, as far as may be:

An effective township fire-fighting unit.

An effective district unit combining all its townships.

An effective State organization, embracing all the districts.

PREVENT "BIG" FIRES.

With the view of preventing a repetition of the holocausts of 1908-1911 which entailed great loss of life and property, the personnel of the "flying squadron" has been chosen from the most efficient fire fighters under state commission.

It will be the aim of the department to mass these men quickly at locations where fires which are likely to assume serious proportions have started.

It is the belief of the chief warden that confusion of efforts to suppress has been responsible for the big fires of the past. His opinion is that concerted and intelligent work, each man trained beforehand in his relative service, will assure control of any fire, even in the worst of slash conditions.

There is, of course, the ever present danger that several fires of serious proportion may occur at the same time. In such an event the inadequacy of the limited patrol at command of this department would doubtless be proven by a repetition of loss akin to that of former years.

EDUCATION PROVES EFFECTIVE.

One of my first activities in the administration of this office was an innovation in the form of an educational campaign for the prevention and suppression of forest fires. To this end a deputy was assigned to special field work and lectures were given in almost every city and rural school room in the forest district, 1912-13-14.

Enthusiasm of the school boys for fire prevention as a result of these lectures, in 1912, made possible the organization of the "Michigan Forest Scouts." In this movement upwards of five thousand grammar and high school boys were enlisted as moral auxiliaries to our regular warden service.

Besides the extinguishing of more than 1,000 lesser fires, the scouts are credited with giving material aid in suppression of several large fires.

More than 150,000 auditors have spread the information conveyed by department lectures. Practically every English speaking person in the forest district has been impressed with the importance of prevention of forest fires.

Comments of the press of Michigan on this educational work have been all commendatory and I am now planning to increase the scope of this work.

Where hundreds of camp fires were reported in 1911 as carelessly left burning by men and boys, a single case of such carelessness was reported in 1914.

In the marked reduction of our fire loss, which shows an annual average of $86,000 for 1912-13-14-15, as compared with an average loss of nearly one million dollars for the decade preceding, the splendid organization of adult fire fighters, perfected under field direction of Chief fire warden Pearson, should be assigned major credit, but that education has also been a factor is well proven.

Supplementing the lecture and Forest Scout work, educational and fire warning signs have been posted on every road and byway of the forest district.

SOLVING RAILWAY FIRE PROBLEM.

With the view of securing first-hand information on the railway locomotive as an agency in setting forest fires, John A. Higgins, an experienced railway man, was deputized by this department, 1912, as an inspector of railway locomotives and rights of way.

Under his findings and direction, rights of way of all permanent railways traversing the forest district have been kept in condition conforming to the provisions of Sec. 12, Act 249, P. A., 1903.

Enforcement of other provisions of the same act, effective under the supervision of the inspector covers:

(1) Prohibition of depositing live coals on right of way.
(2) Use of spark arresters on locomotives.
(3) Reporting by employes of fires on or along right of way.
(4) Arbitrary giving of aid in concentrating help to extinguish forest fires.
(5) Keeping right of way cleared of combustible material.
(6) Arbitrary posting of warning placards.
(7) Arbitrary instruction to employes by executives for prevention and extinguishment of fires.
(8) Inspection of spark arresters and ashpans.

INSPECTION HAS BEEN THOROUGH.

As submitted in my forestry report, 1912, so thorough has been the field inspection and filed reports of same that this department is prepared to furnish on request a detailed statement of conditions on and abutting practically every mile of the railways of the forest district.

Even the transitory logging spurs are transferred and relocated at such timely intervals in the official records as to afford immediate and reliable data.

With the cooperation of executive officials our inspector has enlisted the aid of every department of railway organization. The master mechanics, trainmasters, shop and round house foremen and section crews are in concerted and harmonious spirit for the prevention of forest fires.

Presupposing and guarding against the carelessness of new and uninformed workmen and officials, preliminary inspection of all the locomotives to be assigned to the danger zone are made in February and March.

In the shops the inspector of this department does not depend on the service of the railway mechanics under his instruction, but puts on his shop garments and personally opens and inspects the front ends of all locomotives to insure himself of the stability and safe condition of the mesh and other mechanism. Passing inspection the locomotive is pronounced safe for entrance in summer work.

Expedition of inspection is now furthered by the use of a detection rod, recently designed by Inspector Higgins.

Another innovation and a requirement, insisted on by the inspector, has been the covering of all draft holes in ashpans with protective screens. In further precaution all ashpans taking the draft from the upper sides are ordered equipped with an additional upright wall flange, in order to prevent strewing of cinders and live clinkers on the right of way as a result of the "rocking" of locomotives.

While results are necessarily speculative, it is reasonable to assume on our observation that the policy of systematic inspection of locomotives has reduced loss by reason of their use, 60 per cent in the past three years.

FIRE TOWER ERECTED.

To guard the sparsely settled and slash-littered center of the forest district below the straits, a fire tower has been erected by my direction on the highest location available.

The tower is of steel girders, rises 65 feet from its base and is designed to conform to the regulations of the United States Forest Service.

From the tower observatory, which is given an altitude of several hundred feet by reason of its setting on the highlands of the Hanson game refuge, a discerning survey of approximately 500 square miles is afforded. It commands observation in detection of fire of all of Crawford county and parts of Missaukee, Roscommon, Ogemaw, Oscoda, Kalkaska, Antrim, Otsego and Montmorency counties.

During the next season it is our plan to construct several other fire towers in advantageous locations in the upper and lower peninsulas, near telephone or telegraph stations if possible, so that a force of fire fighters can be called and concentrated at a given point as quickly as possible.

STATE LANDS PROTECTED.

Pursuant to an order issued by your commission I have enforced the clearing of the railway rights of way which traverse state lands.

I am pleased to report that the railways in general have shown a cooperative spirit and that practically all permanent lines operating have met the legal requirements. These requirements provide for 50 feet on each side of the center of the right of way to be free from brush, old logs, ties and other combustible litter. Entire freedom from such litter is required where the right of way is less than 100 feet wide.

State lands on which I have enforced right of way regulations by your order are located in the counties of Delta, Mackinac, Marquette, Baraga, Iosco, Alcona, Alpena, Presque Isle, Cheboygan, Crawford, Ogemaw and Roscommon counties.

Detailed reports of conditions on fractional descriptions of all State lands right of way are on file in my office.

SECOND GROWTH BECOMES VALUABLE.

During the past season I have come to realize more than formerly the great wealth in our second growth timber. The department has exerted its best efforts to save every acre of it possible to protect.

Our policy was at one time to burn over dangerous slashing, under favorable conditions. We have come to appreciate the fact that slashing serves as a nurturing protection for young trees and that areas of slash, protected from fires for a few years, by gradual decay enrich the soil and stimulate the sapling growth.

Where such lands as hold this useful growth are burned over, it grows up a jungle of brakes, weeds and lesser shrubs. Growth of this nature, readily subject to ignition during the entire summer season, maintains in many cases a permanent area for initial fires.

My deduction is:

The abstract solution of the forest fire problem in Michigan is maximum measures for prevention of fires during the period of years necessary for decay of present ground litter and provisions which will prevent the forming of new ground litter.

FIRES DESTROY GAME.

Seedling growth, destruction of which by fire is generally regarded as of minor consequence, has, besides its pro-age value as future trees, much value as game covert.

In the burning of such growth there is to consider, above the values cited, the loss of eggs and fledgelings which perish with the parent birds.

The partridge and other birds seek to avoid molestation by the fox, weasel and other predatory animals by long flights from the swamps to the higher "plains" lands, when choosing nesting places.

Investigation indicates that many of the so-called "plains" fires occurring in the early summer months, in the reports of which the young growth of jack-pine, poplar and deciduous shrubs destroyed is recorded as of no value, have in reality caused the loss of much bird and other useful animal life.

It being beyond dispute that such loss does occur in fires of this kind, it appears inconsistent with economic wisdom to place so much comparative stress on police wardenship to prevent the killing of a single bird by the hunter during the closed season, when such fires which destroy birds by thousands annually, are not given more consideration.

It is the present policy of this department to protect from ravage by fire every acre of land in the district under its supervision, whether it holds merchantable timber, seedling or sapling growth or surface verdure.

This policy is based on our experience and the conclusion that Nature knows best the requirements for replenishment of our forest denuded areas, even where her prime program has been disarranged.

COOPERATION HELPS STATE.

This department, 1911, solicited a system of cooperative exchange of aid with the United States Forest Service on Michigan forest reserves, railway executives and the lumbermen's protective associations.

Executives of both railway and lumber operations have been almost a unit in favor of more effective methods for fire prevention and have confirmed this spirit by expending for precautionary measures an amount in excess of the appropriation made by the State.

Private lumbermen's associations, particularly the Michigan Hardwood Manufacturer's association, and individual lumbermen have actively aided the State wardens by massing their men at given points to suppress fires, in some cases without expense to the state.

In commending the service of W. B. Piper, supervisor of the federal reserves and J. Lee Morford, executive of the Western Michigan Hardwood Protective association, it is fitting that I express my formal appreciation of their intelligent and energetic work in prevention and suppression of fires.

PREPARING FIRE MAP.

With the view of providing for pre-knowledge of local conditions by the field wardens, a map of the forest district is being compiled by townships. This map will give in detail the topography of dangerous fire slash, sapling growth, plains lands void and timbered, valuable merchantable stumpage; swamps, roads, streams and opens as points of vantage for backing or diverting fires. A major portion of the description and data for this map has already been filed.

I have submitted plans to chief warden Pearson for classification of the localities of greatest apparent fire risk. These plans include the formation of local fighting organizations which are, under the direction of the district warden, charged primarily with protection of the obvious danger points.

WAY-CARD FOR RAILWAY FIRES.

This department is considering an innovation which I believe will tend to further minimize loss by forest fires in Michigan.

The proposed change in method of notification of fires by railway employes provides for consecutive numbering of the telephone or telegraph poles on the right of way of railways. The pole number may then be used to designate location of fires.

Flaring red and white cards are kept in a box in the locomotive cab in accord with the plan. When a fire is discovered on or near the right of way by the engineer, he takes a pencil appended by string to the box and marks on the card the number of the pole nearest the fire. The card is thrown to the first section guard he passes. The section crew with its car is then in a position to render prompt assistance.

RAILWAY FIRES CAN BE REDUCED.

That proper spark arresting equipment for railway locomotives, standardized by law, will reduce the number of fires set along the right of way is obvious from the splendid results obtained on lines which have accepted the moral obligation of conforming to the regulations recommended by this department.

I desire to emphasize the importance of making an arbitrary standard, by enactment, for the "front-end" and ashpan equipment. In bringing this matter so particularly before your commission I am influenced by realization that here we have something at hand, tangible, to remedy.

Origin or cause of many fires is unknown. A fire may be the result of the live ember of a partially burned match, cigarette or cigar stub. It may be the result of coals left unextinguished by the camper, the result of lightning or of the sun's rays focused from prisms of the broken glass with which the forest area is quite generally strewn.

Causes, based on carelessness or maliciousness, we may preach against and teach against. Often we apprehend and punish the careless or malicious person. We cannot, however, arrange to have a warden on hand to extinguish the glowing match end of the cigar stub. We cannot prevent ignition of trees or brush by lightning.

In the faulty spark arresting mesh or ashpan equipment of a locomotive, we have a known cause of fire, recognized as such without dispute.

I hold it therefore to be my plain duty to earnestly solicit your commission to request the enactment of a law providing for standard fire-preventive equipment of railway locomotives.

LOCOMOTIVE SPARKS AS FIRE AGENT.

Almost any given point in the forest district of Michigan is within a short distance of railway lines of some kind. The locomotive, being a recognized agent in setting of fires, is doubtless blamed by reason of its general proximity for many fires which it does not set.

Again, it is the consensus of opinion of the field wardens of this department that many of the "railway" fires which have been attributed to sparks from a locomotive have in reality been set by cigar and ciagarette stubs thrown on the right of way from windows of the railway coaches by careless passengers.

Making plausible allowance for fires wrongly assigned, it can hardly be disputed that at least twenty per cent of our fires are caused from sparks from locomotives. In fact every review of forest fires, purporting to be authoritative, excepting the reports of this department, 1912-13-14, have assigned to locomotive sparks more than twenty per cent.

EXPLAINING LOCOMOTIVE SPARK EQUIPMENT.

Use of steel mesh as a spark arrester on the ashpan and exhaust or draft stack of locomotives has long been recognized by railway executives as a wise precaution against fire loss on their own or abutting property.

Expense, attendant on proper equipment, though nominal, is one reason why locomotives are not all kept in safe condition.

Even where executives provide the equipment, carelessness of employes permit it often to get in bad condition.

Then too, the railway executive, if uninformed, is prone to consider expedition of traffic as of more importance than fire precautions. There is a tendency to apprehension that a spark arrester, constructed of mesh sufficiently small as to insure reasonable safety from glowing cinders, may lessen the steaming power of the locomotive in an enbarrassing degree.

Spark or cinder equipment of a locomotive pertains not only to the ashpan and front-end, but to all the mechanism of the locomotive which might by derangement allow escape of dangerous cinders. It is the condition of the front-end mesh and ashpan, however, which is the most important consideration.

THE ASHPAN:

Like the ashpan in a domestic heating stove, the ashpan on a locomotive is the depository for ashes, cinders and slag—the residue of the coal burned which is not carried away with the front-end exhaust.

There are so many things that can happen to the "slide," "hopper" or "dump" ashpan, as designed by locomotive builders, which will allow of the strewing of live cinders along the right of way that rigid inspection should be given them on every possible occasion. In the meantime, fixing of standard precautionary reinforcements is imperative.

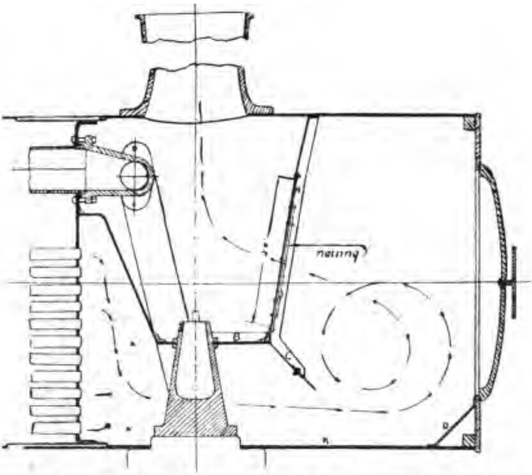
THE FRONT-END: (See cover illustration and page 13.)

Forward of and including that portion of the barrel of a locomotive from which the exhaust stack emerges is designated "front-end." This term as used by railway men embraces, the mesh or spark arrester, the nozzle, the diaphram, the manhole door and all joints and fittings in connection therewith.

Exhaust, which carries with it cinders from the fire bed, as it enters the front-end, first strikes the diaphram, which serves one purpose by establishing a breaking or pulverizing buttress for the cinders.

From the diaphram the cinders are deflected to the mesh, which sets vertically in the barrel, forward of the base of the stack.

Faults, from a fire preventive standpoint, are appertures in the mesh or any other mechanism which will allow the egress of cinders of dangerous size and temperature.



Front-end diagram showing egress of exhaust and cinders.

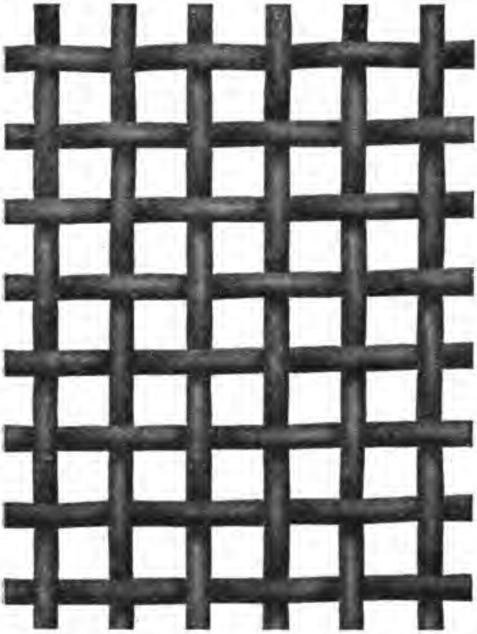
Careful investigation, covering the time of my incumbency as warden, has brought me to the conclusion that the standard for locomotive requirements, which I will hereinafter submit, is the best standard that could be put in effect in this state.

Because, it establishes the maximum for safety from fire with facility for an exhaust which enables the locomotive to do general traffic steaming.

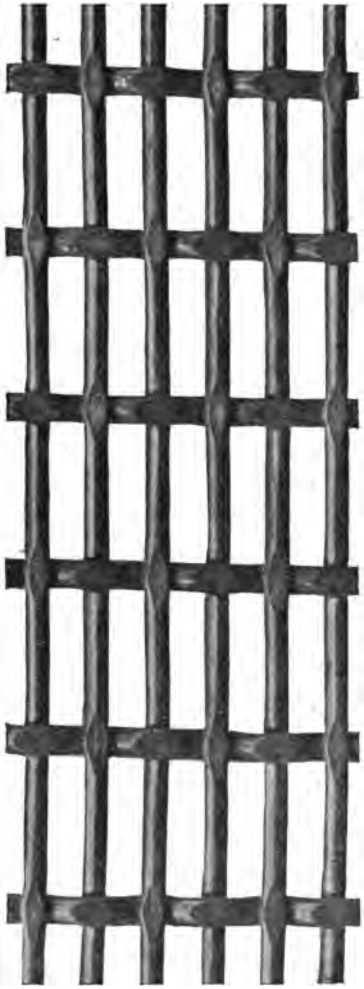
Inasmuch as manufacturers of steel wire mesh have several standards of measurement, so that a given number of wire as ordered from one manufacturer might be of a greater or lesser size than the corresponding number of wire under another standard, consideration should be given to a decimal designation of required wire. This is important to insure staunchness and durability.

Careful experiments, conducted severally by the chief fire warden, the locomotive inspector and other deputies of this department, confirm without dissent my conclusions as to requirements for front-end mesh and ashpans. Tests, scientifically exact, conducted by the staff of Purdue University, 1912-1913, also confirm our findings.

Alternative of the use of square or oblong mesh provides for the service of stocks of either shape, on hand in railway storehouses in Michigan, and against discrimination in favor of any one or class of manufacturers. Construction of front-ends vary and for this reason one shape of mesh may be fitted more availably than the other.



Square form, wire netting, spark arresting screen, double crimped, opening of mesh .198", diameter of wire .135".



Oblong wire netting, spark arresting screen, double crimped; opening of mesh .130″ x .750″, diameter of wire .135″.

We informally recommend, however, the use of the oblong mesh wherever practical, for the reason that its construction under what we regard as the mean of safety size, affords more exhaust or air space in its openings and less chance for egress of dangerous cinders than the square mesh does.

A dangerous cinder is the one of bulk, not area. The further removed the heart of the cinder is from the cooling air, the longer will it retain its high temperature.

Greater air space area of the whole arrester, constructed from oblong mesh, contains in its length and breadth (as per the standard I suggest) .058″ in excess of standard suggested for the square mesh.

SHOULD URGE LEGAL STANDARD.

Permit me to repeat my earnest recommendation that your commission urge on the legislature, provisions as here set forth, which differ considerably from those now in force in the other states, substantially as follows:

> *That spark arresters shall be placed in front-ends of all locomotives traversing the forest district of Michigan (as defined). Screen to be of either square or oblong screen wire netting or its equivalent and to conform to the following requirements:*
>
> *Square mesh wire netting with opening not exceeding .198 inches in both directions, made of wire not less than .135 inches in diameter, or oblong mesh wire netting with width of opening not exceeding .130 inches and length of opening not exceeding .750 inches, made of wire not less than .135 inches in diameter, except on locomotives of main line roads which do not traverse branch lines, where such roads abide by all legal requirements for clearing right of way of combustible material and any further precautionary requirements which the State, Game Fish and Forest Fire Commissioner may deem expedient to guard against grass fires on right of way. That the standard for such roads and locomotives be fixed at a decimal size of mesh in screen not exceeding ¼ inch for square mesh and an equivelant in oblong mesh, corresponding to the comparative size of oblong equivelant for square mesh specification on other locomotives.*

That the State Game, Fish and Forest Fire Commissioner and his deputies shall have power to enforce such requirements, and these further:

> *No opening will be permitted at any place inside of extension front which is larger than the maximum opening specified for wire netting. All joints must be substantially made and reinforced to prevent strands of wire in netting becoming loose and forming larger than normal openings.*
>
> *Particular attention must be given to the fit of spark arresters and plates around the steam pipes, exhaust pipes, blower pipes and air pump exhaust pipe.*

The manhole door must have rigid frame and be properly fitted against the main plate of the spark arrester. Attention must be given to the fit of the plates against the flue sheet. No openings can be permitted between the top of diaphram and the front flue sheet, this joint to be protected with an angle iron or reinforcement.

On ashpan, where openings exist between foundation ring and top of pan suitable guards must be properly fastened. All grate connections must have suitable guards. Slides on hopper pans must project over opening in pan at least 1/2 inch on each side. All openings in pan for draft or dampers must be protected by mesh of same specifications as provided for in front-end mesh requirements.

Wherever required dampers must be provided with flanges on both sides and on bottom, which will project over pan at least 1-1/4 inches. Auxiliary wire dampers of the mesh hereinbefore designated must be installed wherever needed.

STATISTICAL.

Showing loss by fires, cause, cost of extinguishing, number of acres burned over and expenditures by department in preventive and suppressive measures.

FOREST FIRE EXPENSE—JAN. 1, 1915 TO DEC. 31, 1915.

	Salary.	Expense.	Total.
Special Fire Wardens	$8,194 27	$3,955 90	$12,150 17
Printing Fire Notices			113 42
Material for Fire Notices			230 40
Camera			150 00
Tower			102 50
Forest Fire Laws			4 26
Plats			2 40
Total			$12,753 15
Approximate expense of ten district deputy game, fish and forestry wardens as segregated from services as deputy game and fish wardens	$5,090 83	$3,611 40	$8,702 23
Approximate expenses of special deputy—Educational—service—as segregated from deputy game and fish services	658 00	371 50	1,029 50
Grand total			$22,484 88

FOREST FIRE REPORT.—Upper Peninsula

Counties.	Number of acres burned.	Loss.	Cost.	Cause.
Alger	300	$2 50	$16 00	Clearing 1, carelessness 1.
Baraga	843	310 00	74 00	Unknown 2, clearing 2, carelessness 1.
Chippewa	2,540	11,831 00	44 00	Unknown 5, carelessness 1, clearing 1.
Delta				
Dickinson				Unknown 1.
Gogebic	327	300 00	196 00	Unknown 3.
Houghton				
Iron	60	125 00	*	Burning brush 1.
Keweenaw	20	Unknown	75 00	Unknown 1.
Luce	2,443	2,025 00	219 00	Unknown 4, clearing 3, logging engine 3.
Mackinac	5,900	425 00	167 40	Unknown 6.
Marquette	2,590	2,101 50	239 74	Unknown 6, clearing 1, logging engine 1, locomotive 2, carelessness 3.
Menominee				
Ontonagon	325	300 00	185 00	Locomotive 2, burning brush 1.
Schoolcraft	255	600 00	56 00	Unknown 2, campers 1.
Total	15,603	$18,020 00	$1,272 14	Unknown 30, clearing 8, carelessness 9, locomotive 4, logging engine 4.

*Paid by the owner.

The lands burned over were almost wholly plains, slashings and swamp lands. There were 55 fires reported in the uper peninsula for the season 1915.

FOREST FIRE REPORT.—Lower Peninsula.

Counties.	Number of acres burned.		Loss.	Cost.
	Private.	State.		
Antrim	800		$640 00	$79 50
Alcona	3,820		15 00	None
Alpena	140		180 00	22 00
Benzie	2,706		780 00	233 30
Cheboygan	9,570		11,070 00	227 25
Crawford	3,172	81	525 00	158 00
Charlevoix	520		1,250 00	224 20
Emmet	2,912		125 00	*527 90
Grand Traverse	790	400	1,700 00	64 50
Iosco	6	5		
Kalkaska	7,872	640	400 00	322 00
Leelanau	80		250 00	43 00
Manistee	2,359		2,624 00	189 95
Missaukee	1,640		150 00	20 75
Montmorency	2,875		175 00	14 00
Oscoda	28,880		175 00	227 00
Otsego	6,556		1,300 00	250 00
Presque Isle	1,800	1,500	200 00	6 00
Roscommon	3,000		1,000 00	
Wexford	13,400		1,470 00	295 60
Total	92,898	2,626	$23,904 00	$2,904 95

*Paid by settlers.

The lands burned over were almost wholly plains, slashings, and swamp, less than 100 acres of hardwood timber has been reported as damaged by the fire and a very small per cent of second growth was destroyed.

There were 184 fires reported in southern Michigan for the season of 1915. The causes given for these fires were as follows:

Unknown	105	Traction engines	3
Settlers	35	Fishermen	5
Railroads	23	Road fires	4
Campers	6	Set	3

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